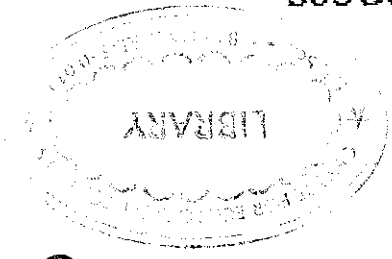


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Centre for Ecological Sciences
Indian Institute of Science
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**A STUDY OF
ENVIRONMENTAL EDUCATION
AND
AWARENESS
IN SELECTED SCHOOLS
OF
BANGALORE**

CENTRE FOR
ECOLOGICAL SCIENCES

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CONTENTS

Page No.

1	Introduction
2	Objective
2	Methodology
3	Results
18	Discussion
20	Suggestions
22	Acknowledgements

List of Tables :

5	Table - 1 : Scores for the effectiveness with which topics concerned with the environment are included in the syllabi - Primary section
6	Table - 2 : Scores for the effectiveness with which topics concerned with the environment are included in the syllabi - Middle section
7	Table - 3 : Scores for the effectiveness with which topics concerned with the environment are included in the syllabi - High school section
9	Table - 4 : Questionnaire for teachers and scores Primary section
10	Table - 5 : Questionnaire for teachers and scores Middle section
11	Table - 6 : Questionnaire for teachers and scores High school section
13	Table - 7 : Questionnaire for students and scores Primary section

14	Table - 8 : Questionnaire for students and scores Middle section
15	Table - 9 : Questionnaire for students and scores High school section
List of figures	
23	Figure - 1 : Comparison of schools following different educational systems
24	Figure - 2 : Comparison of educational levels
25	Figure - 3 : Comparison of students, teachers, and syllabi in different schools
26	Figure - 4 : Environmental awareness scores of students, teachers and syllabi

It is needless to say that the teachers, parents and the school curriculum would play very important role in educating the children about environment and creating environmental awareness amongst them. But not much is known of the extent to which our teachers and the school educational system are equipped to inculcate such an environmental awareness. Hence the need for this study.

account of the deteriorating environment. tomorrow thus saving the human species from much misery on today will be better equipped to manage their environment resources. With proper environmental education, the children of understand the importance of their environment and the natural the environment. It is extremely important for them to know and lies in the future generations who should grow up with a feel for reverse some of the damages done to the environment. But our hope damage to ozone layer etc. It is probably a little too late to deterioration of global ecology, such as green house effect, of life. We are now facing the serious problems of the pollution of air and water which are vital for the very existence non-renewable resources of the earth. Our activities led to industrialization until we started depleting both renewable and long strides in science and technology with accompanying anything seriously wrong with our planet's environment. We took until recently most of us had no idea that there was

I. INTRODUCTION

schools for the sake of convenience. For the present study,

Government (SSLC). These schools will be referred to as SSLC

3. Schools that follow the syllabus of the Karnataka State

be referred as ICSE Schools.

Council of Secondary Education (ICSE). Such schools will hitherto

2. Schools that follow the syllabus prepared by the Indian

be referred as CBSE Schools.

Vidyalaya) fall under this category. Such schools will hitherto

Secondary Education (CBSE). All Central Schools (Kendriya

1. Schools that follow the syllabus of Central Board for

are 3 types of schools.

of syllabus they follow. According to this classification, there

I classified the schools in Bangalore depending on the type

III. METHODOLOGY

awareness in him.

a student about his environment and inculcating environmental

the students' general interest in environment, help in educating

was also to find out to what extent the teachers, the syllabi and

Karnataka State Government syllabi. A second aim of this study

selected schools in Bangalore following the CBSE, ICSE and

students at primary, middle and high school levels in a few

environmental awareness and environmental education amongst the

The objective of this study was to find out the extent of

II. OBJECTIVE

schools. be in the syllabus and their coverage in different categories of SLC schools. Table 1 gives the details of the topics expected to schools. The ICSE schools scored next in this regard followed by covered most effectively in the syllabus followed by CBSE would create environmental awareness amongst the children are According to my data, at primary level, the topics that (i) Primary level :

1. Environmental awareness and education imparted through syllabus

IV. RESULTS

0.1 to 1 to reflect increasing extent of coverage. levels and again graded each topic expected to be covered from the current syllabi of CBSE, ICSE and SLC categories at all middle and high school classes. I have thus carefully looked at thought are necessary to be covered in the syllabi for primary , In addition, I made a list of topics on environment which I reflect increasing knowledge of and concern for the environment. from the teachers and the students was graded from 0.1 to 1 to were interviewed and data recorded in the schedule. Each answer The teachers and students of 6 schools of all the three levels Middle (classes 5 to 7) and High school (classes 8 to 10) levels. questions for teachers and students of Primary (classes 1 to 4), I chose 2 schools from each category. I prepared a schedule of

At high school level also it is found that syllabus of CBSE schools is much better with respect to topics on environment than ICSE and SSLC syllabi. While there is a fair amount of coverage of environmental topics in SSLC syllabus, ICSE syllabus is almost totally devoid of topics on environment (Table 3).

(iii) High School level :

At middle school level also syllabus followed by CBSE schools has more topics on environment than ICSE and SSLC syllabi. The syllabus followed by state government schools is slightly better than the syllabus followed by ICSE schools as depicted in Table 2.

(ii) Middle School level :

	Scores for the effectiveness with which topics concerned with the environment are included in the syllabi		
	SSLC	ICSE	CBSE
1. Living and non-living things	0.8	1.0	1.0
2. Plants and Animals and their usefulness to man	0.7	0.8	1.0
3. Parts of a plant and their functions	0.8	1.0	1.0
4. Domestic and wild animals and their food habits	0.1	0.8	1.0
5. Animals' homes; their adaptations to environment	0.1	0.5	1.0
6. Water, sources and purification	0.7	1.0	1.0
7. Health and hygiene	1.0	1.0	1.0
8. Different kinds of energy	0.8	0.5	1.0
9. Weather and seasons	0.8	0.5	1.0
10. Bacteria and diseases	0.7	0.8	0.8
Total score (out of 10)	6.5	7.9	9.8

PRIMARY SECTION

TABLE - 1

Scores for the effectiveness with which topics concerned with the environment are included in the syllabi			
	CBSE	ICSE	SSLC
1. Classification of plants and animals	1.0	1.0	0.9
2. Growth of plants, shoot and root system	1.0	1.0	1.0
3. Functions of different parts of a plant	1.0	1.0	1.0
4. Insect-plant interaction, pollination	1.0	0.8	0.8
5. Forests and their uses for man	0.0	0.0	0.0
6. Water pollution, causes and hazards	0.5	0.0	0.0
7. Air pollution, causes and hazards	1.0	0.0	0.0
8. Atmospheric gases	1.0	0.4	0.2
9. Adaptations of plants to different environments	0.5	0.0	0.5
10. Health and diseases	1.0	1.0	1.0
Total score (out of 10)			
	8.0	5.2	5.4

MIDDLE SECTION

TABLE - 2

HIGH SCHOOL SECTION

TABLE - 3

Scores for the effectiveness with which topics concerned with the environment are included in the syllabi

Topic	Scores from 0.1 to 1.0		
	CBSC	IGSE	SSLC
1. Environment : Biotic, Abiotic, Biosphere, Ecosystems	1.0	0.2	1.0
2. Food Chain, Food Pyramids, Ecological Succession / Climax	0.8	0.1	1.0
3. Soil Conservation and Conservation of Natural Resources	1.0	0.0	0.8
4. Wildlife Conservation	1.0	0.0	0.8
5. Importance of Forests, Deforestation, Causes for deforestation	1.0	0.0	0.4
6. Species diversity, abundance	0.4	0.0	0.1
7. Air and Water pollution	1.0	0.7	0.8
8. Hazards of pollution to man and nature	1.0	0.5	0.5
9. Population - growth, current level, control	1.0	1.0	0.7
10. Biological control	0.0	0.0	0.5
Total Score (out of 10)			
	8.5	2.5	6.6

2. Environmental awareness imparted through teachers to the students

(i) Primary level :

Teachers handling biology or environmental science and/or general science in all the 6 schools of 3 types were interviewed with the help of a schedule. The teachers in CBSE schools in general seem to impart more knowledge of the environment to children than teachers in other types of schools. Table - 4 shows the details of the questions asked and the performance of the teachers.

(ii) Middle school level :

Here again I found that teachers in CBSE schools take more interest in teaching topics relevant to environmental sciences and they have scored highest marks. The teachers in ICSE schools seemed to put in less effort in imparting environmental awareness amongst the students while teachers of SSLC schools were intermediate (Table - 5).

(iii) High school level :

At high school level, I found that the teachers in CBSE schools instill environmental awareness and educate children with current environmental topics quite effectively. Teachers from ICSE and SSLC schools did not seem to discuss topics on environment other than what is covered in the syllabus. Table - 6 shows the details of the questions the teachers were asked and the grades.

School No.2

School No.1

Mean of the replicates		Total score (out of 10)									
8.45		3.95									
4.95		5.6									
Do you tell children the importance of cleanliness like brushing their teeth and washing their hands ?	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Do you take them out in the field to show different habitats of the animals like earthworms, burrows and birds, nests etc.	0.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Do you make them collect insects and flowers ?	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Do you boil and filter water to show them the impurities ?	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Do you take them to visit any zoos, National Parks and aquaria ?	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Do you make them grow plants in school and observe their growth ?	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Do you ask them to conserve energy like electricity ?	0.5	0.4	0.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Do you tell them about bacteria and the diseases they cause ?	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Do you tell them about what causes rain and the uses of rain ?	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Do you tell them the causes for air pollution ?	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CBSE	81	82	81	82	81	82	81	82	81	82	81
ICSE											
SSLC											

Questionnaire for teachers and scores

PRIMARY SECTION

TABLE - 4

Questionnaire for teachers and scores

MIDDLE SECTION

TABLE - 5

	CBSE			ICSE			SSLC		
	S1	S2	S1	S2	S1	S2	S1	S2	
Do you actually show the children members of different groups of plants and animals ?	1.0	1.0	0.5	0.0	0.0	0.0	0.5	0.5	
Do you let fungus grow on a piece of soap or bread to show children ?	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Do you tell children the importance of saving our forests ?	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	
Do you give them any observational exercise like changes that take place in a tree in different seasons of the year ?	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	
Do you give them an assignment of collecting leaves of different shapes and flowers ?	1.0	1.0	0.5	0.0	0.5	0.5	1.0	1.0	
Do you tell them about the various ill effects of air pollution ?	1.0	1.0	1.0	0.5	0.0	0.0	0.0	0.5	
Do you discuss with children accidents like the Bhopal gas tragedy ?	0.8	0.5	0.0	0.0	0.0	0.0	0.5	0.5	
Have you taken them to any National parks, zoos, aquaria ?	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	
Do you use visual aids like models, charts, slides etc. while teaching environmental science ?	1.0	1.0	1.0	0.5	0.5	0.5	0.8	0.8	
Does your school library get books and magazines on nature and environment ?	0.5	0.5	0.5	0.0	0.0	0.0	0.5	0.5	
Total score (out of 10)	8.9	8.3	3.5	1.5	4.3	5.8			
Mean of the replicates	8.6			2.5			5.05		

TABLE - 6

HIGH SCHOOL SECTION

Questionnaire for teachers and scores

	CBSE	ICSE	SSLC
	S1	S2	S2
1. Do you discuss current environmental problems like deforestation, pollution etc. with children ?	1.0	0.5	0.5
2. Do you tell them about various steps that can be taken to save our forests ?	1.0	0.2	0.0
3. Do you tell them how water pollution affects fish communities ?	1.0	0.0	0.0
4. Do you tell them about Chipko movement ?	0.0	0.0	0.0
5. Do you organize field visits to National Parks or any other place for observational exercises ?	1.0	0.0	0.5
6. Do you arrange lectures and slide shows on environmental topics ?	1.0	0.2	0.0
7. Do you tell them about the number of animal and plant species that are threatened and importance of wildlife sanctuaries to save them ?	0.8	0.5	0.5
8. Do you tell them about the impact on ecology of the area when big dams are built ?	0.5	0.0	0.0
9. Do you discuss accidents like Bhopal gas tragedy and Chernobyl tragedy with students ?	1.0	0.5	0.5
10. Do you use visual aids like models, charts, slides etc while teaching environmental science ?	1.0	0.5	0.5
Total score (out of 10)	8.3	2.4	2.5
Mean of the replicates	7.75	1.8	2.65

3. Environmental awareness amongst students

(i) Primary level :

Children of all schools scored well and exhibited an awareness of the environment required at their level quite satisfactorily. Details of the questions and the students' performance are shown in the table - 7.

(ii) Middle school level :

At middle school level, students from CBSE and ICSE scored fairly well while the performance of students from SSLC schools was average. Table - 8 gives the details.

(iii) High school level :

Students from CBSE and SSLC schools scored fairly well and seem to have reasonable amount of environmental awareness while students of ICSE schools performed poorly (Table - 9).

Questionnaire for students and scores

PRIMARY SECTION

TABLE - 7

REFERENCE ONLY

	CBSE	ICSE	SSLC
Why should you brush your teeth everyday and wash your hands before eating food ?	1.0	1.0	1.0
Name three wild animals and three domestic animals.	1.0	1.0	1.0
Where do you find wild animals ?	1.0	1.0	1.0
Why should we boil and filter water ?	1.0	0.8	0.5
Where is Bannerghatta National Park ? Have you been there ? If yes, which animals did you see ?	0.8	1.0	1.0
How are trees useful to us ?	0.8	1.0	0.7
Where do birds live ?	1.0	1.0	0.8
Have you collected any insects and flowers ?	1.0	1.0	0.0
Can you list three insects that you have seen ?	1.0	1.0	0.8
Where do we get oxygen from ?	1.0	1.0	1.0
Total score (out of 10)	9.8	9.8	7.7
Mean of the replicates	9.7	7.15	7.7

MIDDLE SECTION

TABLE - 8

Questionnaire for students and scores

Question No.	CBSE			ICSE			SCLC		
	S1	S2	S1	S2	S1	S2	S1	S2	
1. What is the function of the leaf ?	1.0	0.8	1.0	0.5	0.2	1.0	1.0	1.0	
2. Which gas do plants produce ?	1.0	1.0	1.0	0.8	0.2	1.0	1.0	1.0	
3. Why should factories be built far away from the city ?	0.5	1.0	0.8	0.6	0.0	0.0	0.8	0.8	
4. Which are the important rivers of Karnataka ?	0.5	0.5	0.5	0.4	0.5	0.8	0.8	0.8	
5. Which are the common birds that you see everyday ?	1.0	1.0	0.8	0.8	1.0	0.8	0.8	0.8	
6. What is the raw material used for making paper ?	0.0	0.0	0.9	0.9	0.0	0.0	1.0	1.0	
7. Can man survive if all the trees are cut ? If no why ?	1.0	0.5	0.9	0.7	1.0	1.0	1.0	1.0	
8. Have you visited any National park, zoo, and aquarium ?	1.0	0.5	0.0	0.0	1.0	0.5	0.5	0.5	
9. Why do plants depend on insects ?	1.0	0.2	1.0	0.5	0.0	0.0	1.0	1.0	
10. Are you a member of any nature club ?	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total score (out of 10)									
	7.0	5.5	6.9	5.2	3.9	7.9			
Mean of the replicates									
	6.25		6.05		5.8				

Questionnaire for students and scores

HIGH SCHOOL SECTION

TABLE - 9

	CBSE		ICSE		SSLC	
	S1	S2	S1	S2	S1	S2
Are you a member of any nature club ?	1.0	0.0	0.0	0.0	0.0	0.0
Do you go for nature walks, birdwatching etc ?	0.8	0.5	0.0	0.0	0.5	0.0
Do you watch programmes on environment on T.V. ?	0.5	0.5	0.5	1.0	1.0	0.5
Which animal is Dr. Salim Ali's name associated with ?	1.0	0.0	1.0	0.0	0.0	1.0
Name a few wild animals that are facing extinction.	0.8	0.5	0.5	0.5	0.5	1.0
Name 3 wildlife sanctuaries in India.	1.0	0.8	1.0	1.0	0.5	1.0
Why should we have wildlife sanctuaries ?	1.0	0.8	0.8	0.8	0.5	1.0
Who initiated the famous Chipko movement ?	0.5	0.0	0.0	0.0	0.0	1.0
What steps should be taken to reduce air pollution in Bangalore ?	1.0	0.5	0.5	0.5	0.5	0.5
When is the World Environment Day celebrated ? brothers, sisters and friends ?	0.0	0.0	0.0	0.2	1.0	1.0
Total score (out of 10)	7.6	3.6	4.3	4.0	4.5	7.0
Mean of the replicates	5.6	4.15	5.75			

Primary > Middle > High school students

be represented as follows :

then high school children who have scored 5.00 (Fig.2). This may followed by students of middle classes with a score of 5.88 and show that children of Primary classes performed best scoring 7.27 schools to see students of which level score better. My results School students of all the three types of schools, i.e. of 6 I combined the scores obtained by Primary, Middle and High

6. Comparison of Primary, Middle and High School levels

CBSE > SSLC > ICSE

(Fig. 1). This may be represented as follows :

of 8.04 followed by SSLC schools with 5.61 and ICSE with 4.51 following results. CBSE schools got the highest rank with a score syllabi under CBSE, ICSE and SSLC schools separately I got the When I pooled the scores obtained by students, teachers and

5. Comparison of schools following different types of education

conducted in the SSLC schools and in one of the ICSE schools.

connected with environmental education were reported to have been prepared posters on the theme "Conservation". No activities WWF-India. During science exhibition, one of the ICSE schools shows on issues of environment and wildlife were arranged from of World Wildlife Fund - India. In one of the CBSE schools slide arranged a 4-day nature camp for children at Bhadra with the help celebrations during the year 1988. One of the CBSE schools Both CBSE schools took active part in Vanamahotsava

4. Activities connected with Environmental Education in Schools

Although here the students' score is the lowest, it may be noted that students of CBSE schools performed much better with 7.18 than the students of ICSE with 5.78 and SSLC with 6.87 where the students' score is higher compared to that of teachers and syllabi (Fig.4).

Syllabus > Teachers > Students

of 7.18 of students. followed closely by teachers score of 8.27 and fairly good score In CBSE schools, the syllabus scored highest with 8.67 (i) CBSE Schools :

This result appears mainly because of the syllabus of CBSE schools which had a very high score. A careful perusal of syllabi of ICSE and SSLC shows that their syllabi is rather poor in environmental topics. Therefore, to get a clearer idea of what source imparts better environmental awareness, I looked at the performance of students, teachers and syllabi under each type of school separately and obtained the following results.

Syllabus > Students > Teachers

I combined the scores of students at all levels for all the schools and that of teachers of all the levels of all the schools and the scores of three types of syllabi to see the extent of environmental awareness imparted by different sources. I found that syllabi scored highest with 6.67 followed by students' score of 6.47 and then teachers' score of 5.00 (Fig.3).

7. Comparison of performance between students, teachers and syllabi

It is seen from the above results that the syllabus of ICSE schools needs to have many more topics on environment than it is now. Although primary and middle school level text books have fairly good coverage, syllabus of high school has almost no topic on environment. The syllabus of CBSE schools has a good coverage of topics on environment and they are taught with a lot of practical exercises. Although SSLC syllabus has some important topics on environment, my discussions with the teachers revealed

V. DISCUSSION

As shown in Fig. 4, the overall performance of students, teachers as well as syllabus seem highest in CBSE schools.

Students > Syllabus > Teachers

teachers with 4.22.

Here also we find that the students score highest with 6.87 followed closely by the syllabus with 6.17 and then by the

(!!!) SSLC Schools :

Students > Syllabus > Teachers.

environment.

In ICSE schools students' score is highest with 5.78 followed by the syllabus with 5.20 and the least score is that of teachers with 2.55. Syllabus gets the score of 5.20 mainly because of the topics covered in primary and middle sections. High school syllabus has very poor coverage of topics on

(!!) ICSE Schools :

In most schools it is noticed that the stress on learning topics specified in the syllabus only from the point of view of

manage outside the school premises. number of children in each class is too large for the teachers to for a field trip to study birds and plants. In some schools the all the children if they have to be taken to any National Park or face for outdoor work. For example, arrangement of transport for mentioned about the various organizational problems that they to pressures of completing the syllabus in time. They also that they are unable to devote more time for practical work due The teachers of ICSE and SSLC schools are of the opinion

the environment better. kind of practical project work would make the children appreciate different types of flowers, leaves of different shapes etc. This project to collect and paste different parts of a plant, are taught about different parts of a plant, they will be given a students are supposed to do independently. For example, when they starting from 1st standard. This includes practical work that the percentage of marks allocated for project work in each class due to the method of teaching that is followed. They have some The students from CBSE schools are at a greater advantage school compound to look at the various kinds of plants or insects. through just text books. Students are not even taken out into the was seen in ICSE schools. All the topics of biology are taught are not exposed to practical experience at all. The same problem that all these topics are taught mostly in theory. The students

3. As far as possible teach biology in nature like taking them to parks if not on long field trips which might have problems

2. Arrange talks and slide shows by experts in the field of environment from scientific institutions or voluntary organizations frequently in the schools.

1. Since there is poor coverage of topics on environment in ICSE syllabus, the teachers were requested to discuss issues of environment of general interest in classes although they are not a part of the curriculum.

While talking to the teachers, the following suggestions were given by me to improve the quality of environmental education in their schools and to create environmental awareness amongst the students.

VI. SUGGESTIONS

Librarians of two of the 6 schools said that the children upto class 8 spend more time looking at the books on nature and environment than the children of classes 9 and 10.

the CBSE schools studied had a nature club in the school. or attending programmes connected with environment. Only one of even outside the school hours in learning about the environment time or opportunity to explore the environment or to spend time high school classes. This leaves the children with very little scoring high marks in the final exams is too much especially in topics specified in the syllabus only from the point of view of

4. Give children small projects to do independently by themselves on environmental topics.

5. Start nature clubs in schools. As a part of the activities of nature club, field trips in and around Bangalore can be arranged on Sundays and holidays. Bird watching, plant and insects species collection can be some of the activities of the club. The club can take charge of arranging film shows on environment, visit industrial sites to study the extent of air pollution etc.

6. Celebrate World Environment Day just as Independence and Republic Days are celebrated in school. Make children aware of the wildlife week by making them preparing posters, slogans etc. Talks by the students on environment would make them learn a great deal.

The above suggestions were well received by the teachers. Some of the senior class children were also found enthusiastic about undertaking some of the above activities.

I am grateful to Prof. Madhav Gadgil and Dr. N.H. Ravindranath of Centre for Ecological Sciences for their encouragement throughout the course of this study and to Dr. Raghavendra Gadagkar for very useful discussions.

VIII. ACKNOWLEDGEMENTS

ENVIRONMENTAL AWARENESS SCORE

COMPARISON OF SCHOOLS
FOLLOWING DIFFERENT EDUCATIONAL SYSTEMS

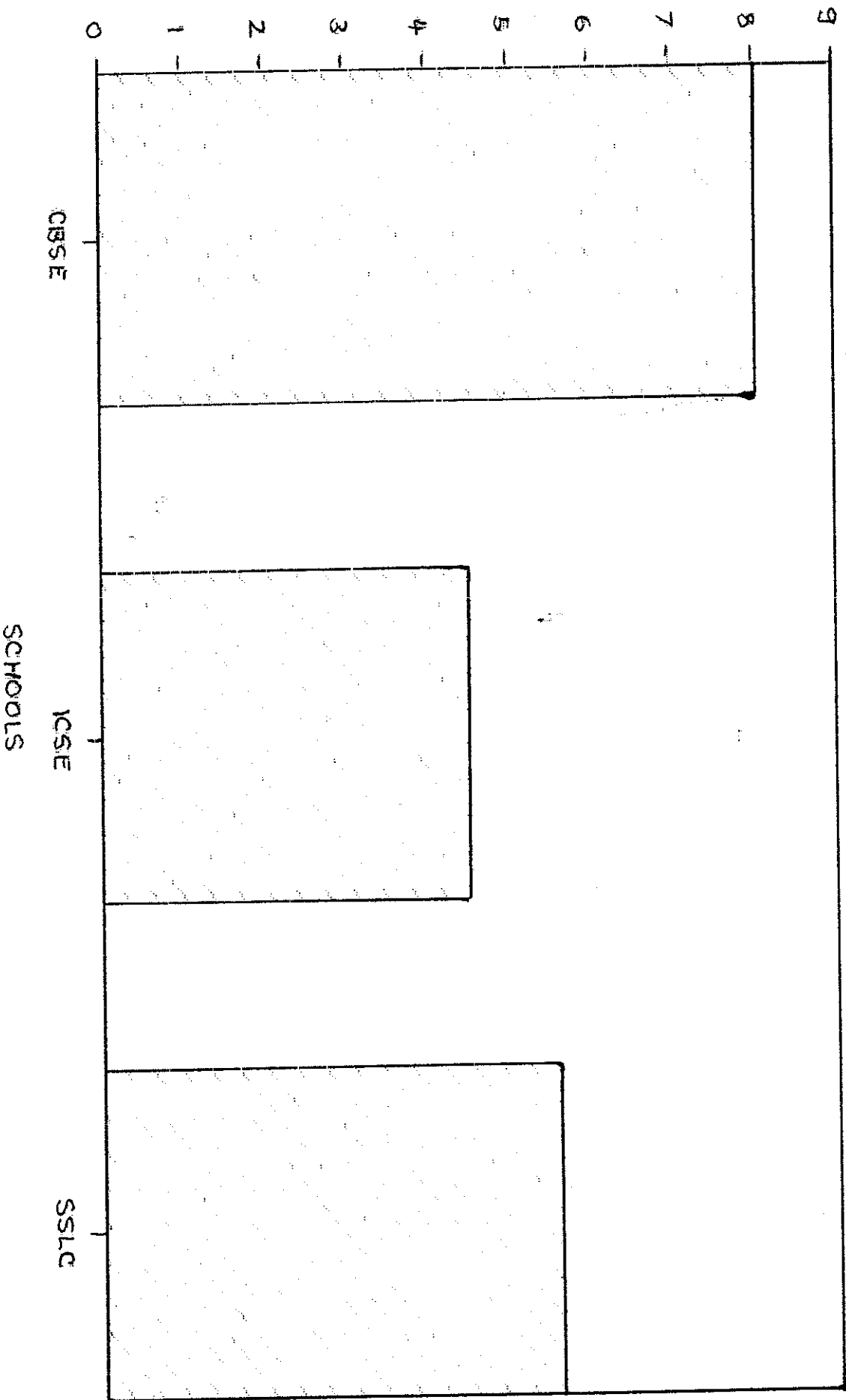


FIG. 1

COMPARISON OF EDUCATIONAL LEVELS

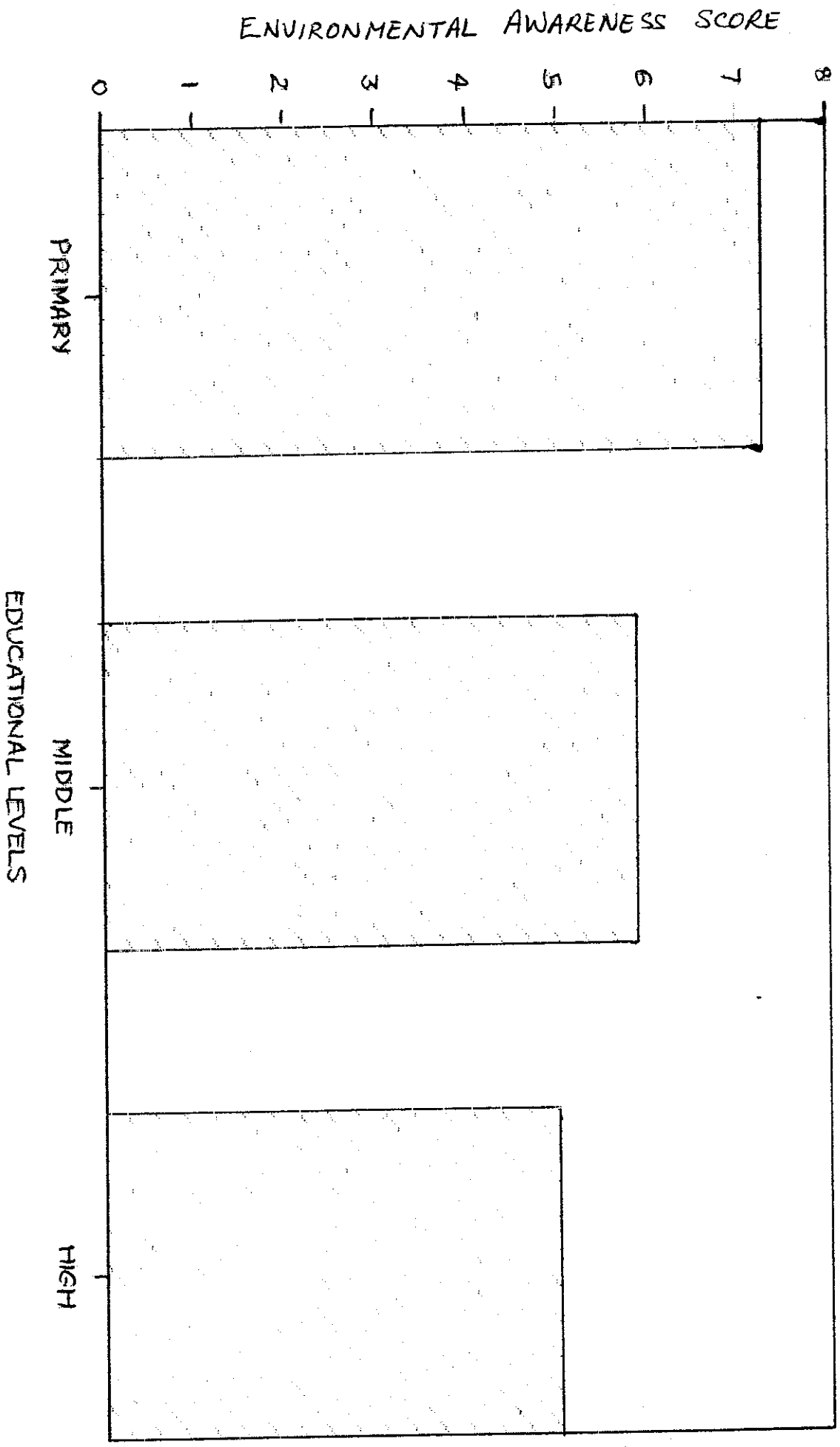
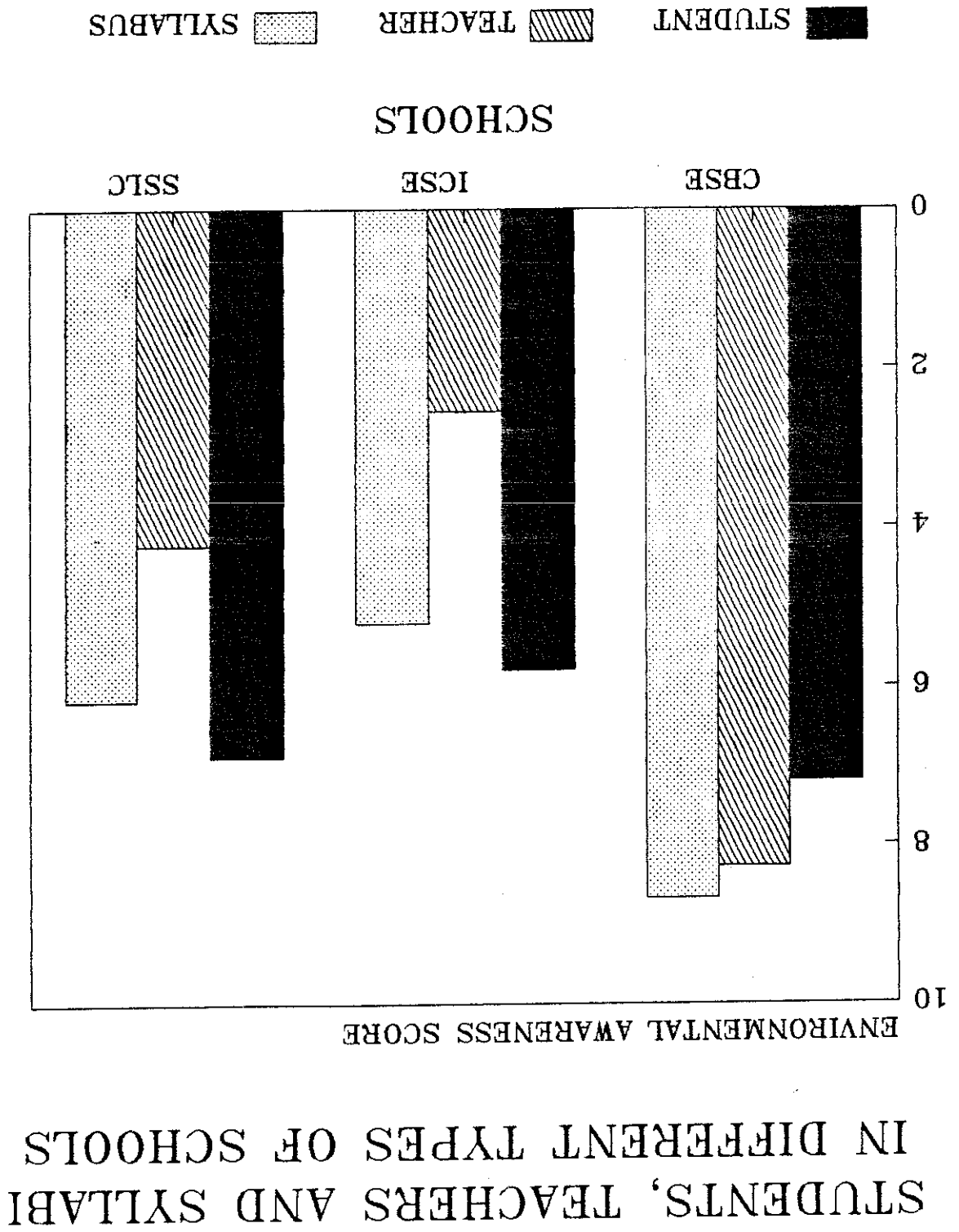


FIG 2

FIG. 3



ENVIRONMENTAL AWARENESS SCORE

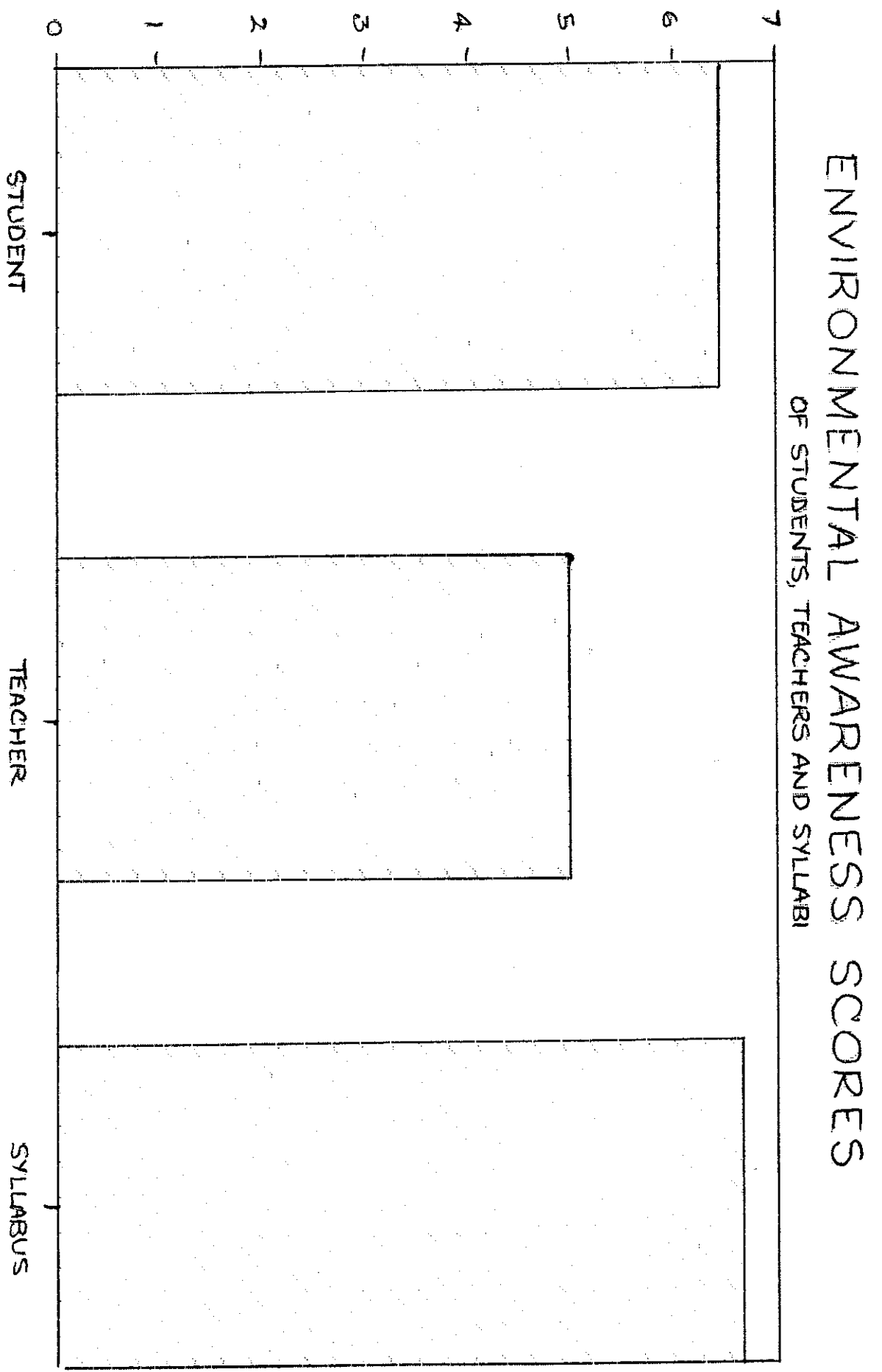


FIG. 4